

Claims

What is claimed is:

- 5 1. A method of counteracting gas ingestion in a hydrodynamic bearing of a spindle motor in a data storage device, the method comprising:  
waiting for activity of a host connected with the data storage device to become idle;  
determining whether to release gas from a fluid of the hydrodynamic bearing of the  
spindle motor; and  
10 responsive to determining to release gas from a fluid of the hydrodynamic bearing of the  
spindle motor, performing a motor spin down routine for the spindle motor.
2. The method of claim 1, wherein determining whether to release gas from a fluid of the  
hydrodynamic bearing of the spindle motor comprises:  
15 determining an amount of time since a previous spin down routine was performed; and  
comparing the amount of time since the previous spin down routine was performed to a  
predetermined amount of time.
3. The method of claim 2, wherein the predetermined amount of time is less than or equal to  
20 24 hours.
4. The method of claim 2, wherein the predetermined amount of time is 12 hours.

5. The method of claim 1, wherein the motor spin down routine for the spindle motor comprises:
- storing original state information from the data storage device;
- spinning down the spindle motor from an operating speed to a stop;
- 5 waiting for a predetermined amount of time;
- spinning up the spindle motor from a stop to the operating speed;
- resetting a timer ; and
- restoring the original state information.
- 10 6. The method of claim 5, further comprising:
- determining whether a new command or reset request has been received by the data
- storage device from the host; and
- responsive to a new command or reset request being received, aborting the motor spin
- down routine.
- 15 7. The method of claim 6, wherein determining whether a new command or reset request has
- been received by the data storage device from the host is performed prior to spinning
- down the spindle motor.
- 20 8. The method of claim 6, wherein determining whether a new command or reset request has
- been received by the data storage device from the host is performed after spinning up the
- spindle motor.

9. The method of claim 5, wherein the predetermined amount of time comprises 2 to 5 seconds.
10. The method of claim 5, wherein the predetermined amount of time comprises 5 seconds.

5

11. A data storage device comprising:

a spindle motor having a rotating shaft, the rotating shaft supported by a hydrodynamic bearing;

a microprocessor coupled with the spindle motor to control rotation of the spindle motor;

5 and

a memory, the memory having stored thereon a series of instructions representing a

routine to counteract gas ingestion in a hydrodynamic bearing of the spindle motor

in the data storage device, the routine, when executed by the microprocessor,

causes the microprocessor to wait for activity of a host to which the data storage

10 device is connected to become idle, determine whether to release gas from a fluid

of the hydrodynamic bearing of the spindle motor, and responsive to determining

to release gas from the fluid of the hydrodynamic bearing of the spindle motor,

perform a motor spin down routine for the spindle motor.

15 12. The data storage device of claim 11, wherein the microprocessor determines whether to release gas from the fluid of the hydrodynamic bearing of the spindle motor by:

determining an amount of time since a previous spin down routine was performed; and

comparing the amount of time since the previous spin down routine was performed to a

predetermined amount of time.

20

13. The data storage device of claim 12, wherein the predetermined amount of time is less than or equal to 24 hours.

14. The data storage device of claim 12, wherein the predetermined amount of time is 12 hours.
15. The data storage device of claim 11, wherein the motor spin down routine for the spindle motor comprises:
- 5 storing original state information from the data storage device;
- spinning down the spindle motor from an operating speed to a stop;
- waiting for a predetermined amount of time;
- spinning up the spindle motor from a stop to the operating speed;
- 10 resetting a timer ; and
- restoring the original state information.
16. The data storage device of claim 15, wherein the motor spin down routine further comprises:
- 15 determining whether a new command or reset request has been received by the data storage device from the host; and
- responsive to a new command or reset request being received, aborting the motor spin down routine.
- 20 17. The data storage device of claim 16, wherein determining whether a new command or reset request has been received by the data storage device from the host is performed prior to spinning down the spindle motor.

18. The data storage device of claim 16, wherein determining whether a new command or reset request has been received by the data storage device from the host is performed after spinning up the spindle motor.
- 5 19. The data storage device of claim 15, wherein the predetermined amount of time comprises 2 to 5 seconds.
20. The data storage device of claim 15, wherein the predetermined amount of time comprises 5 seconds.

10

21. A machine-readable medium having stored thereon a series of instructions representing a routine to counteract gas ingestion in a hydrodynamic bearing of a spindle motor in a data storage device, the routine, when executed by a processor, causes the processor to:  
wait for activity of a host to which the data storage device is connected to become idle;  
5 determine whether to release gas from a fluid of the hydrodynamic bearing of the spindle motor; and  
responsive to determining to release gas from a fluid of the hydrodynamic bearing of the spindle motor, perform a motor spin down routine for the spindle motor.
- 10 22. The machine-readable medium of claim 21, wherein determining whether to release gas from a fluid of the hydrodynamic bearing of the spindle motor comprises:  
determining an amount of time since a previous spin down routine was performed; and  
comparing the amount of time since the previous spin down routine was performed to a  
predetermined amount of time.
- 15 23. The machine-readable medium of claim 22, wherein the predetermined amount of time is less than or equal to 24 hours.
24. The machine-readable medium of claim 22, wherein the predetermined amount of time is  
20 12 hours.
25. The machine-readable medium of claim 21, wherein the motor spin down routine for the spindle motor comprises:  
storing original state information from the data storage device;

spinning down the spindle motor from an operating speed to a stop;  
waiting for a predetermined amount of time;  
spinning up the spindle motor from a stop to the operating speed;  
resetting a timer ; and  
5 restoring the original state information.

26. The machine-readable medium of claim 25, further comprising:  
determining whether a new command or reset request has been received by the data  
storage device from the host; and  
10 responsive to a new command or reset request being received, aborting the motor spin  
down routine.

27. The machine-readable medium of claim 26, wherein determining whether a new  
command or reset request has been received by the data storage device from the host is  
15 performed prior to spinning down the spindle motor.

28. The machine-readable medium of claim 26, wherein determining whether a new  
command or reset request has been received by the data storage device from the host is  
performed after spinning up the spindle motor.  
20

29. The machine-readable medium of claim 25, wherein the predetermined amount of time  
comprises 2 to 5 seconds.



30. The machine-readable medium of claim 25, wherein the predetermined amount of time comprises 5 seconds.